



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

SOLUTION OF AN EXERCISE.

326

A HORIZONTAL beam, span $2a$, is supported at each end ; the load per running foot of length at one support is zero ; at the other support b . Find the deflection of the beam at the centre due to this load.

(1) When the load increases from the zero-support to the b -support as the square of the distance ;

(2) When the load increases as the square-root of that distance.

[*T. U. Taylor.*]

SOLUTION.

1. Calling y the intensity of the load at any point distant x from the left support, we may write

$$y = \frac{bx^2}{4a^2}$$

for the equation to the load. Whence the moment at any point x is

$$M = EI \frac{d^2y}{dx^2} = \frac{1}{6} abx - \frac{1}{48} a^{-2} bx^4.$$

Whence, by integration,

$$EIy = \frac{1}{36} abx^3 - \frac{1}{1440} a^{-2} bx^6 + bx + k.$$

When $y = 0$, x becomes 0 or $2a$; whence

$$K = 0, \quad C = -\frac{4}{45} a^3 b.$$

Hence

$$EIy = \frac{1}{36} abx^3 - \frac{1}{1440} a^{-2} bx^6 - \frac{4}{45} a^3 bx.$$

When $x = a$,

$$y = -\frac{89 a^4 b}{1440 EI},$$

the deflection at the centre.

2. Here $y^2 = \frac{b^2 x}{2a}$,

$$EI \frac{d^2y}{dx^2} = \frac{8}{15} abx - \frac{4}{15} (2a)^{-\frac{1}{2}} bx^{\frac{3}{2}}.$$

$$EIy = \frac{8}{90} abx^3 - \frac{16}{945} (2a)^{-\frac{1}{2}} bx^{\frac{5}{2}} - \frac{208}{945} a^3 bx.$$

At the centre,

$$y = -\frac{4}{945} a^4 b (31 + 2\sqrt{2}).$$

[*H. Y. Benedict.*]